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## EUROPEAN PATENT APPLICATION

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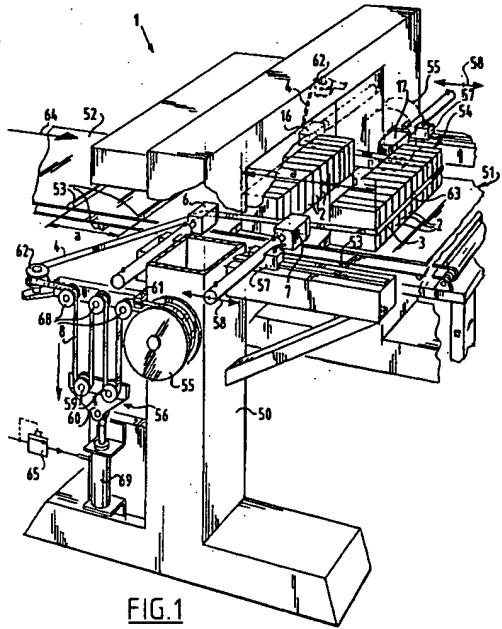
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### ⑲ Device for arranging a thermoplastic strip round an object.

⑲ The invention relates to a device for arranging a thermoplastic strip round an object, which device is provided with at least one set of strip arrangers (6,7,16,17) moveable toward and away from each other for pressing toward each other around the object the portions of a strip extending between that object and supply rollers (55) and already wrapped around that object in a U-form and consisting of tapes (4) pre-fixed to each other at their ends and coming from the supply rollers, two welding elements present on the front surface of each strip arranger facing toward the oppositely placed strip arranger for mutually welding at two locations the tapes pressed against each other by the strip arrangers, a severing member supported by the first strip arranger between the two welding elements thereof for separating the two welding locations, in addition to means for controlling the strip arrangers, wherein in order to enlarge the capacity of such a device it is provided with at least two sets of strip arrangers.



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The invention relates to a device as according to the preamble of claim 1.

The invention has for its object to provide a device of the above stated type which has a larger capacity than the known devices of this kind. To this end the device according to the invention is distinguished in that at least two sets of strip arrangers are present.

Mentioned and other features of the invention will be elucidated further in the description hereinbelow of an embodiment of the device according to the invention. In the drawing in schematic form:

Figure 1 shows a perspective view of the device according to the invention;

Figures 2-5 show top views of the device of figure 1 during arrangement of a strip;

Figures 6a to 6e show on a larger scale horizontal and schematic sections of detail VI of figure 4 in five different operational stages of the welding unit used in the device.

The device 1 according to the invention comprises a frame 50, a conveyor belt 51, for example an endless belt 52 with stop strips 53, on which elements 2 are moved forward stepwise in arrow direction 64. The objects 54 can be single elements 2, but usually consist of a series of elements 2 which are combined by means of a thermoplastic strip 3 into a packet.

Each strip 3 is formed by two tape pieces 4 which are welded to each other at two separate locations to form a loop. On each side the device 1 has a tape supply roller 55, a tape tensioner 56 and two strip arrangers 6, 7 and 16, 17 respectively. The set of co-acting strip arrangers 6 and 16 are situated at a fixed position while the set of strip arrangers 7, 17 are adjustable in arrow direction 58 by means of adjusting means 57 to adapt the distance a between the two sets of strip arrangers to the width size b of the objects 54. The strips 53 are also fixed to the belt 51 at a distance a. In the embodiment shown each tape tensioner 56 comprises a plurality of fixed guide rollers 68 and a plurality of moveable guide rollers 59 which are mounted in a roller carrier 60 which is pulled downward by an air spring 69 with a pressure adjustable by control means 65 in order to guide the tape 8 in a meander shape. The tape tensioner 56 has on its input side a tape clamp 61 which fixedly clamps the tape 8 in an adjusted manner which is per se known. From the tape tensioner 56 the tape 8 is guided via a guide roller 62 along the strip arrangers 6, 16 and 7, 17 to a welding location 63, where two tapes 8 are mutually joined. When the process of wrapping with the tape 8 begins, two tapes are first mutually joined with a weld 63. On the conveyor belt 51 a series of objects 54 is then supplied which are situated at a mutual pitch distance a against strips 53. b is the width of the packet.

The conveyor belt 51 is displaced stepwise each time over a distance 2a such that the strip arrangers 7 and 17 are situated opposite the interspace between two objects 54 for processing. All the sets of strip arrangers 6, 7 and 16, 17 are then moved toward each other, wherein the strip arrangers 7 and 17 are first pressed against each other, followed shortly afterward by the strip arrangers 6 and 16. The lengths of tape 8 are herein delivered by the tape tensioners 56 such that two objects 54 are enclosed with tape, while the tapes 8 are held under a considerable tensile stress.

Figures 6a to 6e show a per se known welding unit which is formed by the two mutually facing free ends of each strip arranger 6 respectively 7 and 16 respectively 17.

The relevant ends have a tubular form, wherein the one strip arranger 7 is provided with a heating plate 34 provided with a melting member 35 in the form of a vertically oriented ridge on the heating plate 34. The heating plate is heated electrically via the clamps 36.

The other end of the opposite strip arranger 17 is provided with a counter-element 37 moveable therein, each consisting of two parts having in each case a counter pressure surface 38, which parts are moveable away from each other with a spring 39. In the closed position according to figure 6 a pressure fork 40 can be placed between the free ends of the strip arrangers 7, 17.

The operation of the per se known welding unit is as follows:

Figure 6a shows the position in which the strip arrangers 7, 17 are moved toward each other and wherein a tape 8 runs in each case round the free ends of the strip arrangers 7 and 17 and is clamped between the fork 40. The heating element 34 is subsequently moved forward in the direction of the arrow P1 and melts the tape 8 through with the melting member 35. With further movement each half of the tape is nestled against the inside of the fork. When the heating plate 34 is moved further in the direction of the arrow P1, see fig. 6c, the melting member 35 then melts through the opposite tape 8 round the free end of strip arranger 17. With the return movement of the heating plate 34 and the opposite counter-element 37 in the direction of the arrow P2, the tape halves of the right-hand tape 8 are nestled against the inside of the fork 40 and onto the tape halves of the left-hand tape 8 already lying there.

The tape halves have meanwhile been brought to a sufficient temperature by the heating plate 34 to effect a weld between the two tape halves of the tape 8, see fig. 6e. Pressing is furthered by the two elements 38 of the counter-element 37 which are pressed outward against the inside of the fork 40 by the spring 39.

The counter-element 37 is then moved back in the direction of the arrow P3 and the above described welding cycle can be repeated.

When as according to figure 5 two object 2 are simultaneously provided with an encircling tape, the four strip arrangers are retracted and conveyor belt 51 displaced over a distance 2a and the processing steps are repeated.

It is conceivable that, instead of two, three or even more objects 54 are provided simultaneously per processing cycle with a thermoplastic strip.

Within the scope of the invention it is also possible to embody the frame 50 in figure 1 with the strip arrangers and tape feed means placed thereon for movement along the conveyor belt 52, wherein the conveyor belt 52 can be seen as an existing conveyor belt already present in the production process.

A number of encircling tapes above one another in the vertical sense can of course also be welded simultaneously, so that the packets are encircled with multiple strips.

It is further possible for the tapes to encircle the packets not in a horizontal plane but in a vertical or even diagonal plane.

The invention is not limited to the above described embodiments.

### Claims

1. Device for arranging a thermoplastic strip round an object, which device is provided with at least one set of strip arrangers moveable toward and away from each other for pressing toward each other around the object the portions of a strip extending between that object and supply rollers and already wrapped around that object in a U-form and consisting of tapes pre-fixed to each other at their ends and coming from the supply rollers, two welding elements present on the front surface of each strip arranger facing toward the oppositely placed strip arranger for mutually welding at two locations the tapes pressed against each other by the strip arrangers, a severing member supported by the first strip arranger between the two welding elements thereof for separating the two welding locations, in addition to means for controlling the strip arrangers, **characterized in that** at least two sets of strip arrangers are present.
  
2. Device as claimed in claim 1, **characterized in that** a first set of strip arrangers and a second set of strip arrangers are disposed one behind the other in the direction of the transporting movement of the objects.

3. Device as claimed in claim 1, **characterized in that** the leading set of strip arrangers in the transporting direction of the objects closes earlier than the trailing set of strip arrangers.

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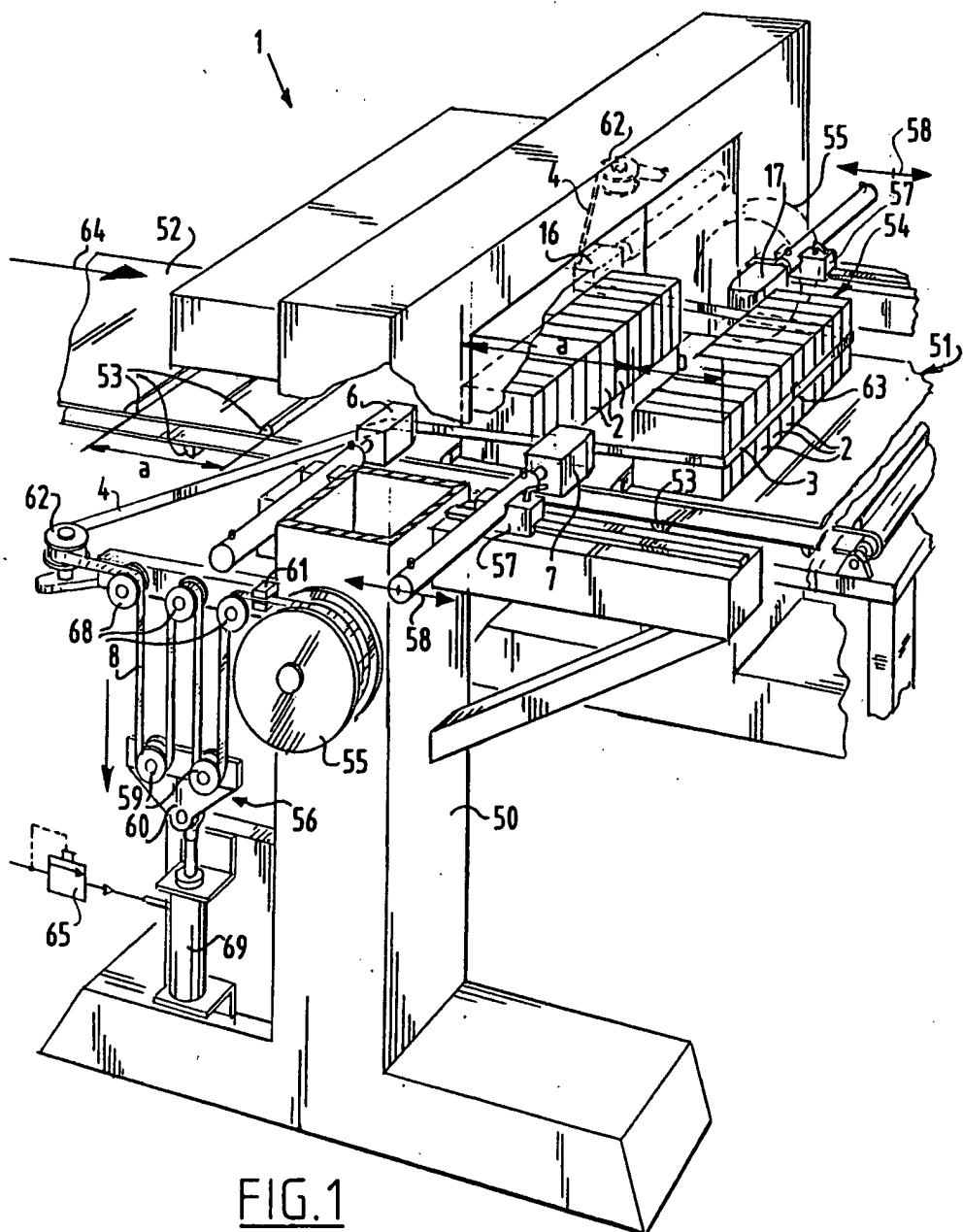
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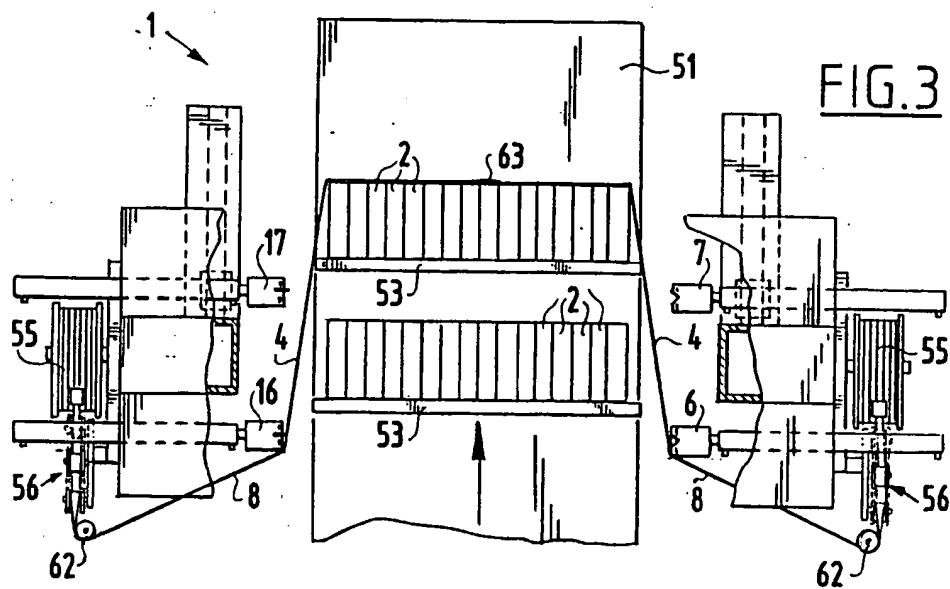
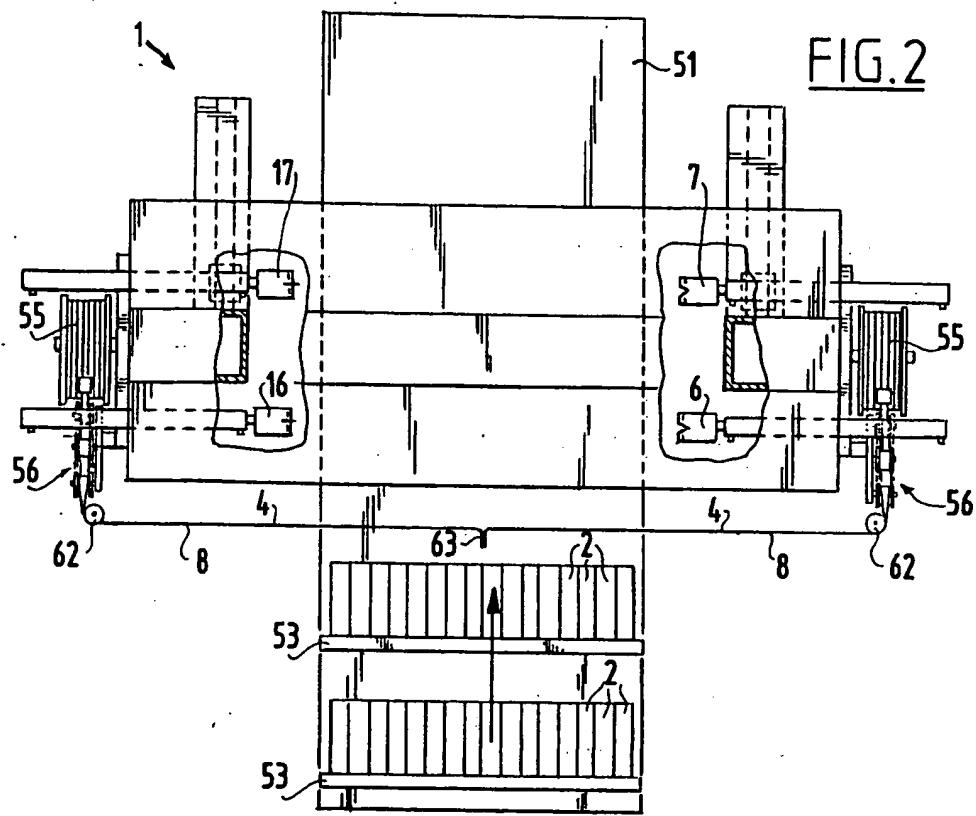
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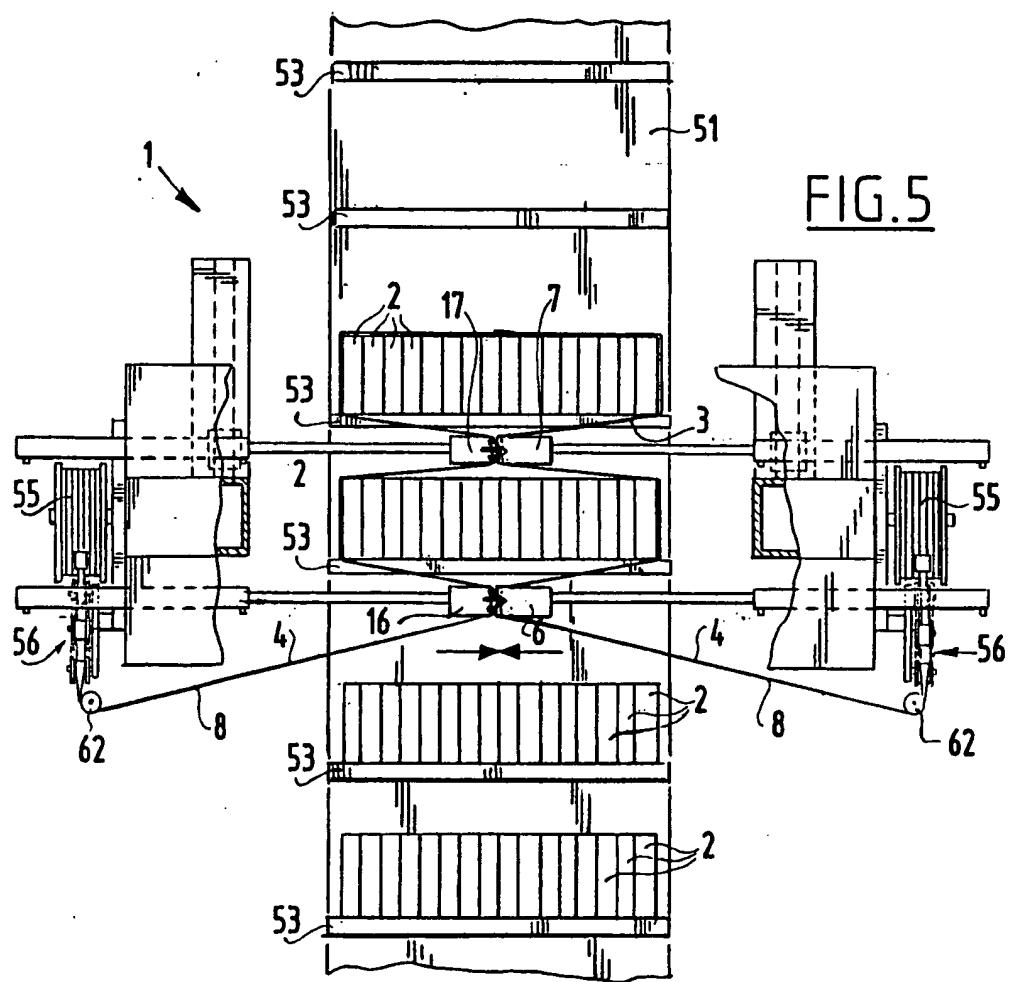
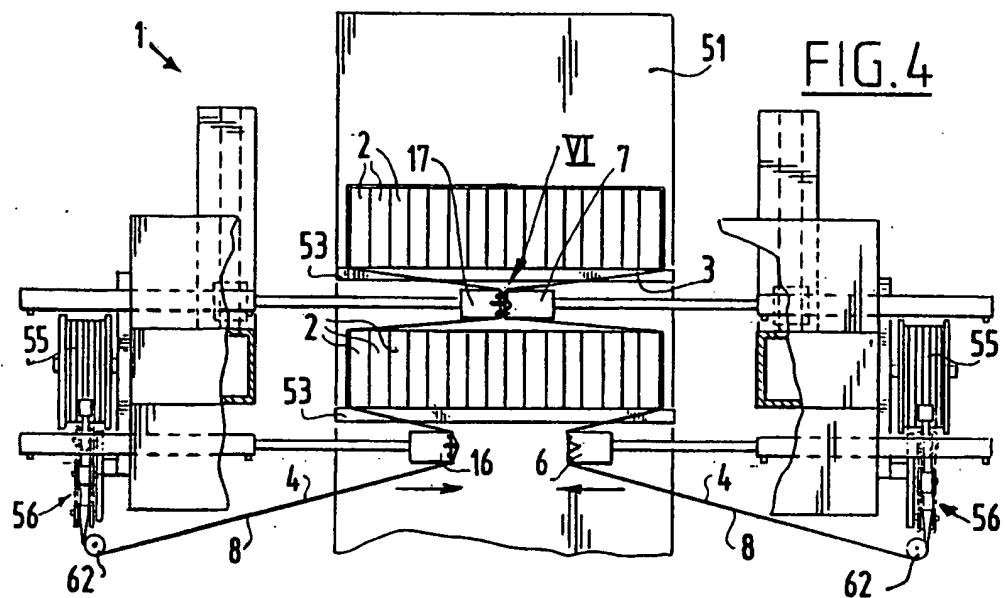
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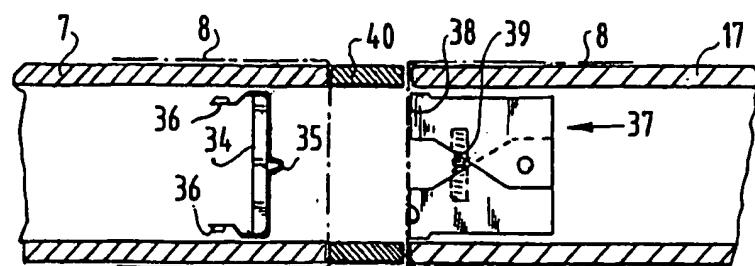


FIG. 6a

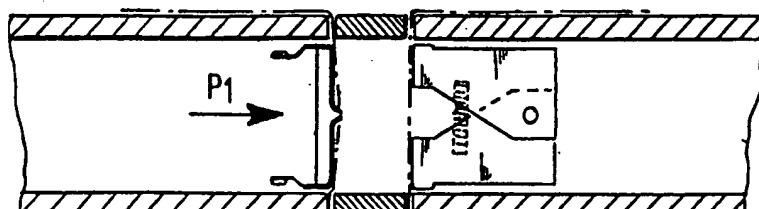


FIG. 6b

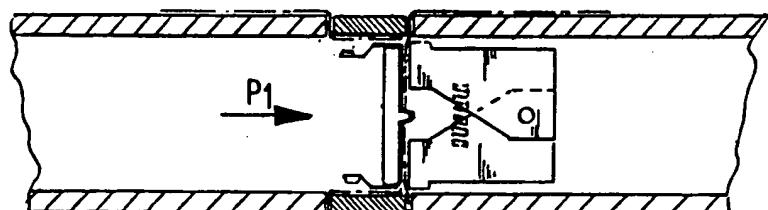


FIG. 6c

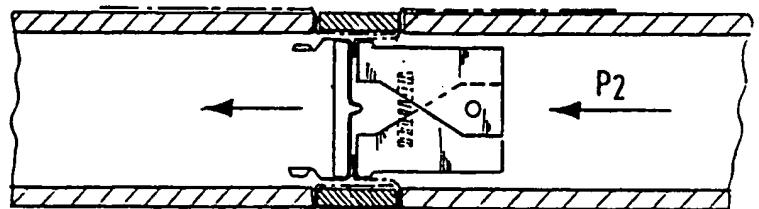


FIG. 6d

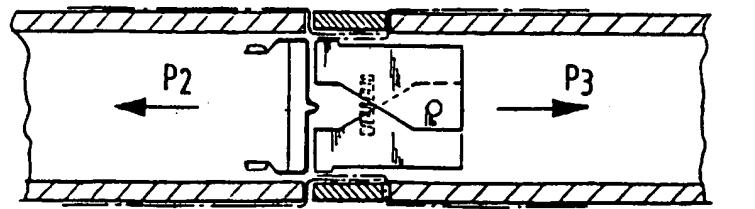


FIG. 6e



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## EUROPEAN SEARCH REPORT

Application Number  
EP 93 20 2844

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.CLS)
Y	EP-A-0 225 665 (ENDRA) * abstract; figure 1 * ---	1-3	B65B13/02
Y	US-A-3 729 894 (STOHLQUIST) * column 4, line 28 - line 63; figure 6 * -----	1-3	
TECHNICAL FIELDS SEARCHED (Int.Cl.5)			
B65B			
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	12 January 1994	CLAEYS, H	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	
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